

IV. Remarks

Claims 1-16 were originally in the application. Applicants have amended claim 1 to correct a typographical error and have amended claim 12 to change the dependency thereof. Claim 14 has been cancelled and rewritten in independent form as new claim 18. New claim 17, support for which may be found in original claim 14, has been included to provide adequate coverage for the invention. Accordingly, claims 1-13 and 15-18 remain pending in the application for consideration.

Specification

The Examiner has objected to the arrangement of the specification of the subject application as not including all of the section headings included in 37 CFR 1.77(b).

Applicants note that the additional section headings noted by the Examiner are "suggested" for inclusion, as needed. Applicants submit that all of the section headings required to be included in a complete U.S. utility patent application are, and originally were, present in the subject application. As the other headings have no applicability to the present application, Applicants believe that they would only be confusing, and therefore respectfully decline the Examiner's proposal to include the other "suggested" section headings.

The Examiner has further noted certain other informalities in the specification of the subject application. Applicants have amended the application to address each of the informalities noted. Accordingly, Applicants respectfully submit that the amended

specification now meets the requirements of the patent regulations. Favorable reconsideration of the specification is requested.

Claim Rejections – 35 USC §112

The Examiner has rejected claims 1-14 and 16 under 35 USC §112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter of the invention.

More specifically, the Examiner has rejected claim 1 as failing to provide sufficient antecedent basis for the term “the organic source.”

Applicants have amended claim 1 to more clearly define that the source of oxygen is the organic ester, which term has clear antecedent basis in the claim.

The Examiner has also rejected claim 12 as not providing sufficient antecedent basis for “gallium trichloride” in line 1 of the claim. Applicants have amended the dependency of claim 12 to depend from claim 5, wherein the inorganic gallium halide is defined as gallium trichloride. Claim 5, in turn, depends from claim 1. Thus, Applicants submit that as amended, claim 12 provides clear antecedent basis for “the gallium trichloride.”

Applicants submit that claims 2-14, which depend from claim 1, as well as amended claim 1 itself, are sufficiently definite and meet the requirements of 35 USC §112, second paragraph. Withdrawal of the rejection is respectfully requested.

Further, the Examiner has rejected claim 16 under 35 USC § 112, second paragraph, and 35 USC § 101 as not meeting the requirements of a method/process claim.

Applicants submit that claim 16 clearly and definitely states the step of utilizing an inorganic gallium halide and an organic ester to form a gallium oxide coating on a hot glass substrate by chemical vapor deposition. As noted by the Board of Patent Appeals and Interferences in *Ex parte Porter*, 25 USPQ 2d 1133, 1147 (Bd. App. 1992), claim 16 has been drafted in what has been an acceptable format for years. In that case, the Board stated that, "contrary to the Examiner's assertion that claim 6 has no method step, the claim clearly recites the step of 'utilizing'." Applicants therefore submit that claim 16 fully complies with 35 USC §101 and §112. Favorable reconsideration of claim 16 is respectfully requested.

For the reasons noted above, Applicants submit that claims 1-14 and 16 meet the requirements of 35 USC § 112, second paragraph. Withdrawal of the rejections is respectfully requested.

Claim Rejections – 35 USC § 103

The Examiner has rejected claims 1-13 and 15-16 under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 6,238,738 to McCurdy, in view of U.S. Patent No. 5,474,851 to Gänswein.

The Examiner indicates that the McCurdy reference discloses the process of the present invention, but does not disclose gallium as a metal. The Examiner further notes that the process of McCurdy is used to "modify the characteristics of glass for architectural use." The Examiner cites Gänswein '851 as depositing gallium oxide to produce an anti-reflective film, which is "modifying the characteristics of the glass for architectural use." In the Examiner's view, it would have been obvious to one of

ordinary skill in the art of thin films to combine the McCurdy and G  nswein references to deposit thin films of gallium oxide on a substrate.

Applicants respectfully submit that the claimed invention is not obvious in view of the McCurdy and G  nswein references. The invention, as defined in claim 1, is a chemical vapor deposition process for depositing a gallium oxide coating on a hot glass substrate comprising preparing a precursor gas mixture comprising an inorganic aluminum halide and an organic ester having a β hydrogen on the alkyl group bonded to the carboxylate oxygen, maintaining said precursor gas mixture at a temperature below the temperature at which the inorganic gallium halide reacts with the ester to form a gallium oxide coating while delivering the gaseous mixture to a coating chamber which opens onto the hot glass substrate, and introducing the precursor gas mixture into the coating chamber, whereby the gaseous mixture is heated to above the reaction temperature of the gallium halide and the ester and incorporates oxygen from the ester to cause the deposition of the gallium oxide coating.

According to the MPEP, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." See MPEP 2143. Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F. 2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Neither McCurdy nor G  nswein provide any information that would motivate one skilled in the art to attempt to deposit a gallium oxide film on a hot glass substrate by a CVD process using a combination including an inorganic gallium halide and an alkyl ester.

Applicants note that the McCurdy reference fails to provide any indication that a main group metal, such as gallium, would react sufficiently with an organic alkyl ester to form a gallium oxide film. Applicants have tried to form metal oxide films with other main group metals and an alkyl ester, such as ethyl acetate, without success. For example, Applicants have found that halides of silicon and antimony combined with ethyl acetate do not produce viable oxide films on hot glass substrates. This is in contrast to the transition metals, such as the titanium oxide to which the McCurdy reference is primarily directed.

Further, Applicants' experience, as well as the scientific literature, suggests that to the extent films can be formed utilizing an inorganic tin precursor and an organic alkyl ester, film formation can only be accomplished under static deposition conditions where deposition can be maximized in a small area, as contrasted to dynamic, online deposition methods, where calculation of film thickness must be integrated over the much larger area of a moving glass ribbon. Such calculations support the real-world result, i.e., that tin oxide films at commercially viable thicknesses cannot be formed utilizing an inorganic tin compound and an organic alkyl ester by a dynamic, on-line deposition process. Accordingly, one skilled in the art would not be motivated to look to a method of deposition of transition metals to deposit a main group metal such as gallium.

Without any such suggestion in the art, the Applicants' own specification has been improperly used to supply such motivation. "A rejection cannot be predicated on the mere identification in [the reference] of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). A prior art suggestion for virtually endless experimentation is not a case of *prima facie* obviousness. *In re Dow Chemical Co.*, 5 USPQ 2d 1529 1532 (Fed. Cir. 1989). In view of the cited references, it is at best obvious to try the specific deposition process discovered and claimed by the Applicants from the many possible combinations outlined therein. This is not the standard of 35 USC §103. *In re Geiger*, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987).

As there has been no showing of any motivation to modify the references to obtain each and every limitation of independent claim 1, this claim is not rendered obvious by McCurdy and G  nswein.

For at least these reasons, Applicants respectfully submit that one skilled in the art would not be motivated to look to the McCurdy and G  nswein references alone, or in combination, to achieve the invention of the present application. Claim 1 is thus patentable over the cited references. As claims 2-13 depend directly or indirectly from claim 1, Applicants submit that at least for the reasons described herein, they are likewise patentable over the cited references.

The Examiner has rejected claim 15 as being obvious over the McCurdy and G  nswein references, asserting that it would be obvious in light of the cited references to deposit gallium oxide films online at atmospheric pressure.

Applicants submit that for the reasons noted in connection to claim 1, it is not obvious to be able to deposit the main group metal gallium in an on-line, atmospheric pressure chemical vapor deposition process utilizing the defined chemistry. Further, one skilled in the art would not be motivated to look to the electron beam deposition method of G  nswein, as it is a static deposition process operated in a vacuum chamber, so clearly it is not on-line, at atmospheric conditions. There is no motivation for combining the starkly contrasting processes of McCurdy and G  nswein, as suggested in the office action. For all of these reasons, Applicants submit that claim 15 is patentable over the McCurdy and G  nswein references.

Claim 16 defines a method of utilizing an inorganic gallium halide and an organic ester, the organic ester having 3-6 carbon atoms to form a gallium oxide coating on a hot glass substrate by chemical vapor deposition. Again, it is not obvious to be able to deposit the main group metal by a chemical vapor deposition process utilizing the defined chemistry. Further, one skilled in the art would not be motivated combine the starkly contrasting processes of McCurdy and G  nswein, as suggested in the office action. For all of these reasons, Applicants submit that claim 16 is patentable over the McCurdy and G  nswein references.

Allowable Subject Matter

Applicants note with appreciation the indication that claim 14 contains allowable subject matter. Claim 14 has been cancelled and rewritten in independent form as new claim 18. It is therefore submitted that new claim 18 is in condition for allowance.

Applicants have also added new claim 17, which further defines claim 16 wherein the gallium oxide coating has a refractive index of about 1.7-1.95. It is submitted that new claim 17 is allowable.

Conclusion

For all of the reasons set forth herein, Applicants respectfully submit that the application is now in condition for allowance, and a timely action to that end is courteously solicited. If, however, the Examiner has remaining questions, or would prefer language different than that proposed herein, the favor of a telephone call to Applicants' attorney is requested.

Respectfully submitted,



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